Claims:

1. A piezoelectric ceramic comprising a perovskite composite oxide of an ABO_3 composition containing Pb in the A-site and Zr and Ti in the B-site, wherein when the total amount of the element species constituting the B-site of the perovskite composite oxide in the ceramic is set to be one mol, an average valency of the element species constituting the B-site is in a range of from 4.002 to 4.009.

2. A piezoelectric ceramic according to claim 1, wherein said piezoelectric ceramic contains the constituent element species of the perovskite composite oxide in such amounts that satisfy the molar ratios expressed by the following formula,

$$[Pb_{y-a}M^1_a] \cdot [M^2_bM^3_c(Zr_{1-x}Ti_x)_{1-b-c}] \cdot O_{3+\alpha}$$

wherein M^1 is at least one kind of element species constituting the A-site selected from the group consisting of Ca, Sr, Ba, Nd and Li,

M^2 is at least one kind of element specifies constituting the B-site selected from the group consisting of Y, Dy, Ho, Er, Tm, Yb and Lu,

M^3 is at least one kind of element species constituting the B-site selected from the group consisting of W, Nb and Sb, and

a, b, c, x, y and α are expressed by the following conditions:

$0.98 \leqq y \leqq 1.01$

$0.01 \leqq a \leqq 0.1$

$0.005 \leqq b \leqq 0.025$

$0.005 \leqq c \leqq 0.015$

$0.45 \leqq x \leqq 0.55$

$-0.03 \leqq \alpha \leqq 0.02$.

3. A piezoelectric ceramic according to claim 1, wherein the piezoelectric ceramic has an average grain

size in a range of 1 to 6 μm.

4. A method of producing a piezoelectric ceramic comprising the steps of:

preparing a starting powder for a perovskite composite oxide which comprises a starting compound for the A-site and starting compounds for the B-site of the perovskite composite oxide, wherein at least a Pb oxide is contained as the starting compound for the A-site and at least a Zr oxide and a Ti oxide are contained as the starting compounds for the B-site, the starting compounds for the B-site being contained in such amounts that when the total amount of the element species constituting the B-site is calculated to be one mol, an average valency of the element species of the B-site is 4.002 to 4.009;

calcining said mixed powder at not higher than 900°C;

preparing a slurry for molding by adding an organic binder to a calcined body obtained through said step of calcining, and preparing a molded body of a predetermined shape by using said slurry; and

firing said molded body.

5. A method of producing a piezoelectric ceramic according to claim 4, wherein the starting powder for said perovskite composite oxide has been adjusted to be a fine powder having an average grain size D_{50} of not larger than 0.8 μm.

6. A method of producing a piezoelectric ceramic according to claim 5, wherein said calcined body has an average grain size D_{50} of not larger than 0.8 μm.

7. A method of producing a piezoelectric ceramic according to claim 4, wherein Pb_3O_4 is used as said Pb oxide.

8. A method of producing a piezoelectric ceramic according to claim 4, wherein said firing is conducted

at 950 to 1000°C.

9. A laminated piezoelectric element obtained by alternately laminating a plurality of piezoelectric layers and a plurality of internal electrode layers, said piezoelectric layers being constituted by the piezoelectric ceramic of claim 1 and being polarization-treated.

10. A laminated piezoelectric element according to claim 9, wherein said piezoelectric layers are treated in an electric field in a no-load state prior to being subjected to the polarization treatment.

11. A laminated piezoelectric element according to claim 10, wherein said treatment in the electric field is conducted by the application of a DC voltage, an AC voltage or a pulse voltage of 20 to 200 V.

12. A laminated piezoelectric element according to claim 10, wherein gaps are partly formed in the interface among the piezoelectric layers and the internal electrode layers.